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A new species of *Pristigaster,* with comments on the genus and redescription of *P. cayana* (Teleostei: Clupeomorpha: Pristigasteridae)

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Abstract.—A new species of the hitherto monotypic genus *Pristigaster* (Clupeiformes: Pristigasteridae) is described for the Amazon basin. *Pristigaster whiteheadi,* new species, is distinguished from its only congener, *P. cayana,* by the presence of pelvic fins; the lack of caudal-fin filaments; the different angle between the predorsal bones and the vertebral column; the presence of 36–39 vertical scale rows (40–47 in *P. cayana*); and the presence of 18–20 horizontal scale rows (21–26 in *P. cayana*). *Pristigaster cayana* is redescribed, and its occurrence in French Guyana is questioned.

Resumo.—Uma nova espécie do gênero até então monotípico *Pristigaster* (Clupeiformes: Pristigasteridae) é descrita para a bacia Amazônica. *Pristigaster whiteheadi,* espécie nova, distingue-se de *P. cayana* pela presença de nadadeiras pélvicas; ausência de filamentos nos lobos da nadadeira caudal; o ângulo diferente entre os ossos pré-dorsais e a coluna vertebral; a presença de 36–39 fileiras verticais de escamas (40–47 em *P. cayana*); e a presença de 18–20 fileiras horizontais de escamas (21–26 em *P. cayana*). *Pristigaster cayana* é redescrita e sua ocorrência na Guiana Francesa é questionada.

The Clupeomorpha is a highly diverse group of teleosts, containing over 350 recent and over 150 fossil species (Grande 1985, Nelson 1994). The group is one of the most important fisheries resources worldwide, and their phylogenetic relationships within teleosts have been a matter of intense debate in recent years. For the past two decades, following the original suggestion by Patterson & Rosen (1977), Clupeomorphs were placed as the sister group to the Euteleostei. More recently, Clupemorpha have been proposed as sister group to Ostariophysi, a hypothesis supported by molecular data (Van Le et al. 1993, Patterson 1994) and morphological characters (Lecointre & Nelson 1996, Johnson & Patterson 1996, Arratia 1997).

Clupeomorphs are a demonstrably monophyletic group (Grande 1985) including basal fossils as the extinct genera *Diplomystus* and *Armigatus,* and the extinct order Ellimmichthyiformes. Recent clupeomorphs are all in the order Clupeiformes, itself divided into suborders Denticipitoidei (with a single species from African freshwaters) and Clupeoidei (all other recent clupeiforms). Clupeoids comprise three superfamilies: Engrauloidea (with a single family, Engraulididae), Clupeoidea (with families Chirocentridae and Clupeidae) and Pristigasteroidea (with families Pristigasteridae and Pellonidae).

The pristigasteroid family Pellonidae includes the central and South American genera *Chirocentrodon, Neoopisthopterus, Pellona, and Pliosteostoma.* The Pristigasteridae, in turn, comprises the Central and

South American *Odontognathus* and *Pristigaster,* the South American and Indo-Pacific *Opisthopterus* and the Indo-Pacific *Raconda.* The genus *Ilisha* could not be demonstrated monophyletic by Grande (1985), most of its species forming a polytomy at the base of Pristigasteroidea.

Pristigaster is the most peculiarly-shaped of all pristigasteroids, with an extremely deep body resembling characiforms of the genera *Gasteropelecus* and *Thoracocharax.* So far a single species, *P. cayana,* is recognized in the genus. All other proposed names have been shown to be either invalid or junior synonyms of that species (Whitehead 1973, 1985). However, Whitehead (1985) suggested that a second species might exist. Stimulated by Whitehead's original suggestion, we undertook a detailed examination of available material of *Pristigaster,* and concluded that indeed there is a second diagnosable species in the genus, still undescribed. In this paper, we formally name and diagnose the new species and redescribe *P. cayana.*

Methods and materials.

Morphometric measurements were all point-to-point, taken with calipers, recorded to the nearest 0.1 mm and expressed as percentages of standard length, except for subunits of the head, expressed as percentages of head length. Counts and measurements were made on the left side of the specimens, whenever possible, according to Whitehead (1985), except for horizontal rows of scales (counted between dorsal-fin origin and anal-fin origin), vertical rows of scales (counted from origin of pectoral fin to caudal base), and scales around caudal peduncle (number of horizontal scale rows). Principal caudal-fin rays included all branched rays plus one unbranched ray in each lobe. Counts for each lobe, upper first, are separated by a slash. Vertebral counts were taken from radiographs and cleared and stained specimens and the terminal "half centrum" is included. Specimens were dissected to determine sex by an incision on the right side of the abdomen to expose the gonads. Tooth counts include sockets in cases where the actual tooth has fallen off. Within the meristic information given here, figures for holotype are provided in parentheses.

Figures associated with specimen lists in species descriptions are, first, number of specimens examined in respective lot, and second, range of SL's in mm.

Specimens cleared and counterstained for bone and cartilage were prepared by a modified version of the method of Taylor & Van Dyke (1985). Descriptive accounts follow the general organization in Whitehead & Teugels (1985), the most complete anatomical survey of a clupeomorph available to date. Synonymic lists include only those references in which the species referred to can be reliably identified as either *P. cayana* or *P. whiteheadi.*

Specimens examined in this work are deposited in the following institutions: AMNH, American Museum of Natural History, New York; BMNH, The Natural History Museum, London; FMNH, Field Museum of Natural History, Chicago; INPA, Instituto Nacional de Pesquisas da Amazônia, Manaus; MZUSP, Museu de Zoologia, Universidade de São Paulo, São Paulo.

Pristigaster whiteheadi, new species
Figs. 1, 2B

Pristigaster cayana (not Cuvier); Whitehead, 1985:301 (in part, only specimens with pelvic fins); Whitehead & Bauchot, 1985:24 (in part, only specimens with pelvic fins); Stewart, Barriga & Ibarra, 1987:21 (specimen examined).

Holotype.—MZUSP 52963 (female, 83.4 mm SL). BRAZIL: Amapá, Rio Araguari, Ferreira Gomes, collected by M. Goulding, January–February, 1984.

Paratypes.—Brazil: MZUSP 30341 (2, 76.5–83.4), same data as holotype. Amazonas; MZUSP 11391 (8, 57.5–67.7, 2 of

which cleared and counterstained), AMNH 227329 (1, 52.2), USNM 351306 (1, 62.0), FMNH 107783 (1, 56.5), Rio Içá, Santo Antônio do Içá; MZUSP 11392–393 (2, 69.4–73.0), Rio Solimões, above mouth of Jutaí; MZUSP 11394–403 (10, 43.5–76.2), Rio Solimões, Fonte Boa; MZUSP 27597 (1, 62.00, Rio Solimões, Município de Benjamin Constant; MZUSP 18694 (3, 29.4–40.0), Rio Solimões, Lago Janauacá and vicinity; MZUSP 52950 (2, 22.0–25.0), Rio Solimões, 3°10′57″S, 67°56′31″W; MZUSP 6600 (1, 70.0), Lago Manacapuru; MZUSP 18512 (1, 67.0), mouth of Rio Ituxi; MZUSP 18516 (1, 70.0), mouth of the Paciá; INPA 8555 (21, 18.0–66.6, 3 of which cleared and stained), Paraná do Tapurá, near mouth of Rio Madeira; MZUSP 6220 (1, 84.0), Rio Negro, Igarapé Jaraquí, above Manaus; MZUSP 52951 (1, 39.0), Rio Jauaperi, 1°34′54″S, 61°28′48″W; MZUSP 52952 (2, 57.7 and 67.0), Rio Negro, 1°33′48″S, 61°33′02″W; MZUSP 49597 (3, 28.3–37.3), Rio Acre, above Boca do Acre; MZUSP 7625 (1, 67.0), Rio Amazonas, Paraná do Mocambo, above Parintins; BMNH 1897.12.1.197–199 (3, 62.8–65.0), Rio Juruá; MZUSP 52949 (21, 47.0–86.0), Rio Japurá, Paraná do Japurá, 3°09′12″S, 64°46′54″W; MZUSP 52962 (1, 63.3), Rio Amazonas, 1°54′S, 55°31′W; MZUSP 52948 (5, 35.5–76.0), Rio Madeira, below Nova Olinda; MZUSP 52958 (1, 36.0), Rio Madeira, 3°33′37″S, 58°59′49″W; MZUSP 52957 (1, 34.0), 3°33′18″S, 58°59′57″W, MZUSP 52959 (1, 41.0), 3°29′21″S, 58°51′38″W, MZUSP 52960 (1, 30.5), 3°26′44″S, 58°49′49″W, MZUSP 52961 (4, 30.5–41.0), 3°33′S, 58°55′W, Rio Madeira, Paraná do Urucurituba. Roraima: MZUSP 11404 (1, 33.0), Rio Branco, 20 kilometers below Boiaçu. Pará: MZUSP 52953 (1, 28.0), 1°35′S, 52°11′W, MZUSP 52954 (7, 50.0–55.0), 1°27′S, 52°03′W, Rio Amazonas, Furo do Urucuricaia; MZUSP 5493 (1, 85.0), Rio Trombetas, Oriximiná; MZUSP 52955 (1, 53.7), 1°29′S, 52°5′W, MZUSP 52956 (8, 22.3–66.5), 1°36′S, 52°12′W, Rio Amazonas, below Rio Xingu. ECUADOR. FMNH 101946 (1, 89.0) 0°49′S, 75°31′W, Río Tiputini, near mouth in Río Napo and Quebradas).

Diagnosis.—Distinguished from its only congener, *P. cayana,* by the following features: 1—presence of pelvic fins; 2—absence of filaments on upper and lower lobes of caudal fin; 3—vertical scale rows 36–39 (40–47 in *P. cayana*); 4—horizontal scale rows 18–20 (21–26 in *P. cayana*); 5—supraneurals (predorsal bones) gradually less sloped posteriorly, posterior one nearly perpendicular to vertebral column (supraneurals all equally sloped in *P. cayana*). Most specimens of the new species can also be distinguished from *P. cayana* by lower gill raker counts (18–21, versus 21–25 in *P. cayana*) and by lower anal-fin ray counts (41–48 versus 44–53 in *P. cayana*).

Description.—Meristic and morphometric data are presented in Tables 1 and 2. For a general aspect of the fish, refer to Fig. 1. Body highly compressed, ventral profile of body extremely expanded and convex, its anterior region (at isthmus) almost perpendicular to longitudinal axis of fish. Five protruding predorsal supraneurals strongly inclined anteriorly. The entire abdominal region, from isthmus to anal-fin origin, bordered by a series of 29–34 (holotype 31) abdominal scutes, gradually more prominent posteriorly. Scutes anterior to vertical through pectoral-fin base mostly imbedded in soft tissue, those posterior to that point protruding markedly beyond abdominal profile resembling a series of translucent hooks. Pelvic-fin origin usually over 25th scute (as in holotype), rarely over 24th or 26th scutes.

Snout blunt, always shorter than orbital diameter. Mouth subterminal and turned dorsally, its lower jaw protruding beyond upper. Maxilla extending slightly posterior to vertical through anterior margin of eye. Teeth conical, minute, disposed in a single irregular row in both jaws and highly variable in number, becoming more numerous with growth. Premaxillary teeth 8 (in spec-

Table 1.—Selected meristic features of *Pristigaster cayana* and *P. whiteheadi*.

	Pristigaster cayana				*Pristigaster whiteheadi*				
	n	Range	Mean	*SD*	*n*	Holotype	Range	Mean	*SD*
Branched dorsal-fin rays	79	12–13	12.177	0.384	95	12	11–13	12.053	0.305
Branched pectoral-fin rays	79	10–12	10.848	0.622	95	10	9–11	10.537	0.522
Branched pelvic-fin rays					95	3	3–4	3.137	0.346
Branched anal-fin rays	73	44–53	48.096	2.076	93	44	41–48	44.258	1.436
Gill rakers	77	21–25	22.208	0.848	95	21	18–21	19.895	0.722
Horizontal rows of scales	55	21–26	23.182	1.090	35	—	18–20	19.114	0.631
Vertical rows of scales	39	40–47	43.077	1.797	18	—	36–39	38.222	0.878
Scales around caudal peduncle	18	15–16	15.833	0.383	9	—	13–15	14.556	0.726
Premaxillary teeth	58	9–23	16.862	3.322	78	14	8–18	11.962	1.970
Maxillary teeth	62	18–80	53.871	14.140	84	63	14–64	40.000	11.600
Dentary teeth	49	5–14	9.408	2.188	53	9	5–9	7.132	1.301
Ventral scutes	75	30–35	32.013	1.257	92	31	29–34	31.065	0.849
Vertebrae	7	42–44	43.428	0.728	7	—	43–44	43.286	0.488

imens <44 mm SL) to 18 in larger specimens (holotype 14). Maxillary teeth 14 (in 22 mm SL specimen) to 64 (in 79 mm SL specimen) (holotype 63). Dentary teeth 6 (at 43 mm SL) to 9 in larger specimens (holotype 9). Eyes very large, round in external aspect. Pupil extremely large relative to eye size, its diameter almost 60% that of orbit. Adipose eyelid weakly developed in young, but covering most of iris in adults.

Gill cover rounded in profile, with continuous membranous margin concealing a marked depression on posterior margin of opercle. Dorsal limit of gill opening slightly ventral to horizontal at dorsal margin of eye. Gill rakers slender, closely set and conspicuous, their number increasing with growth, ranging from 18 (at 22 mm SL) to 21 (at 83 mm SL) (holotype 21) on lower part of first branchial arch and from 8 to 12 (holotype 11) on upper part.

Table 2.—Morphometrics of *Pristigaster cayana* and *P. whiteheadi*. Standard length is expressed in mm; measurements 1 to 12 are proportions of standard length; 13 to 16 are proportions of head length.

	Pristigaster cayana				*Pristigaster whiteheadi*				
Character	*n*	Range	Mean	*SD*	*n*	Holotype	Range	Mean	*SD*
Standard length	79	23.5–142.0	66.68	—	95	83.4	22.0–86.0	56.12	—
1. Body depth	78	0.38–0.65	0.550	0.041	95	0.56	0.42–0.58	0.534	0.031
2. Predorsal length	79	0.39–0.48	0.421	0.014	95	0.43	0.40–0.48	0.425	0.017
3. Prepectoral length	78	0.23–0.31	0.271	0.012	95	0.27	0.24–0.31	0.272	0.013
4. Prepelvic length					95	0.59	0.48–0.61	0.571	0.025
5. Preanal length	78	0.57–0.70	0.649	0.023	95	0.67	0.54–0.71	0.657	0.024
6. Caudal peduncle depth	79	0.08–0.11	0.096	0.008	95	0.09	0.07–0.12	0.098	0.007
7. Head length	79	0.25–0.31	0.287	0.010	95	0.29	0.25–0.32	0.286	0.012
8. Dorsal-fin base	79	0.12–0.16	0.138	0.009	95	0.12	0.12–0.17	0.145	0.012
9. Dorsal-fin length	72	0.24–0.33	0.283	0.020	94	0.26	0.24–0.32	0.289	0.018
10. Anal-fin base	78	0.42–0.53	0.486	0.026	95	0.44	0.42–0.50	0.467	0.016
11. Pectoral-fin length	79	0.17–0.28	0.250	0.016	95	0.23	0.16–0.26	0.230	0.015
12. Pelvic-fin length					94	0.04	0.02–0.07	0.048	0.006
13. Snout length	79	0.18–0.26	0.223	0.021	95	0.25	0.21–0.29	0.247	0.015
14. Eye diameter	79	0.33–0.44	0.393	0.022	95	0.40	0.34–0.45	0.399	0.023
15. Interorbital width	79	0.12–0.21	0.176	0.016	95	0.20	0.18–0.25	0.205	0.013
16. Upper jaw length	79	0.41–0.57	0.486	0.033	95	0.49	0.43–0.53	0.479	0.019

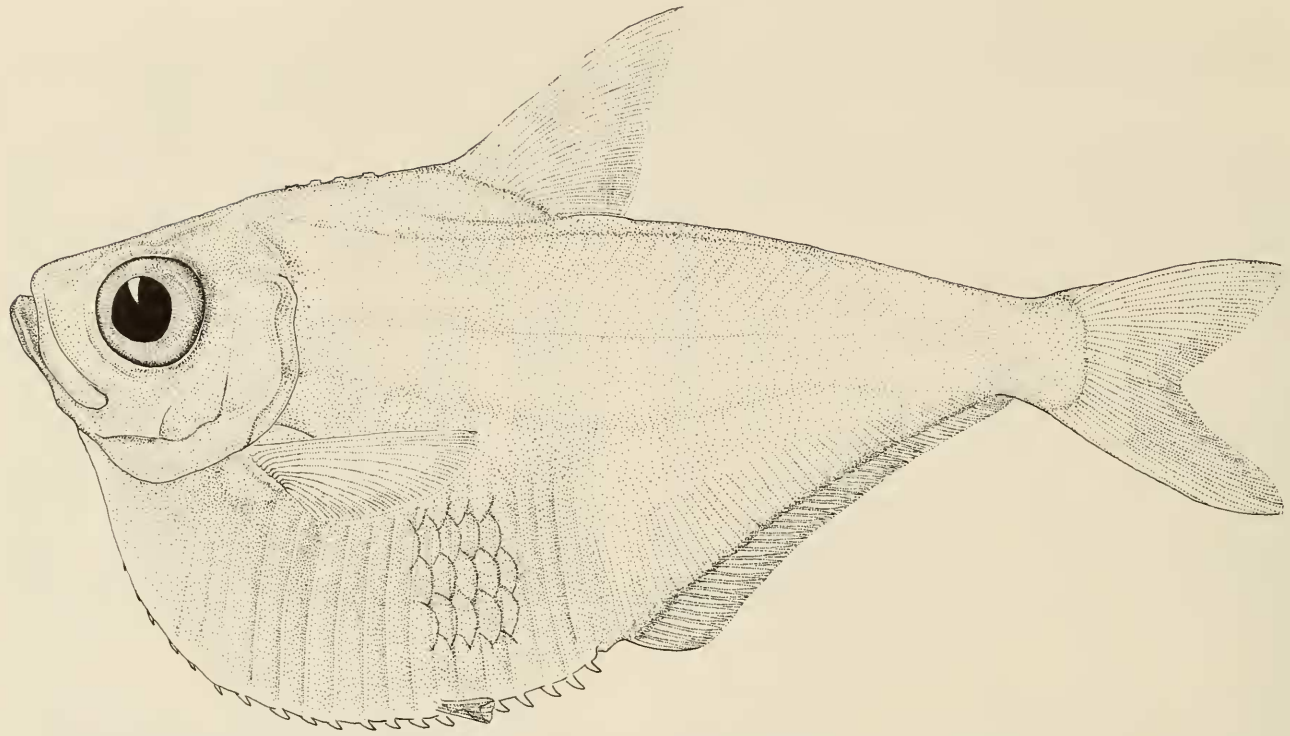

Fig. 1. *Pristigaster whiteheadi*, new species, holotype, MZUSP 52963, 83.4 mm SL.

Dorsal fin triangular when extended, pointed dorsally; origin located on anterior half of SL, and anterior to vertical through anal-fin origin. Dorsal-fin rays iii+(12)–13, third ray (unbranched) longest, twice as long as fin-base. Pectoral-fin origin located at middepth of body, slightly dorsal to ventral margin of gill cover and slightly anterior to its posterior margin. Pectoral-fin length shorter than HL, its posterior tip, when adpressed to body, reaching beyond vertical through dorsal-fin origin. Pectoral-fin rays i+(10)–11. Axillary scale present on region dorsal to pectoral-fin base, extending for approximately 20% of fin. Pelvic fins minute, length spanning approximately the space of three consecutive abdominal scutes, with origin located nearly at ventral margin of body, at vertical through posterior tip of pectoral fin. Pelvic-fin rays i+3+i. Anal fin long and low, its origin slightly posterior to vertical through posterior end of dorsal-fin base. Anal-fin rays ii–iii+41–47 (holotype ii+44); rays progressively shorter posteriorly. Tips of last anal-fin rays reaching base of inferior caudal-fin basal fulcra. Caudal fin deeply forked, lower lobe slightly longer than upper. Caudal-fin rays 10/9. Vertebrae 43 or 44.

Scales large (approximately same size as pupil) and cycloid, covering all of body, and easily detachable, rarely preserved in their entirety. Vertical scales rows 36–39. Horizontal rows 18–20. Scale covering extending to midlength of middle caudal-fin rays. Entire anal-fin base rimmed by row of small scales (about half as large as remaining body scales).

Pigmentation in alcohol.—Dorsum, snout and upper part of sides brown. Remainder of body silvery due to heavy deposits of guanine (which tend to disappear after extended preservation). Narrow concentrations of dark melanophores on upper and lower lips, and sometimes anterior portion of chin. Region corresponding to neurocranium dark, due to brain pigment visible through translucent skull bones. Scattered dark chromatophores along entire dorsum and upper sides, more concentrated along dorsal-fin base and dorsal part of caudal peduncle. A middorsal dark spot is sometimes present anterior to dorsal fin (as

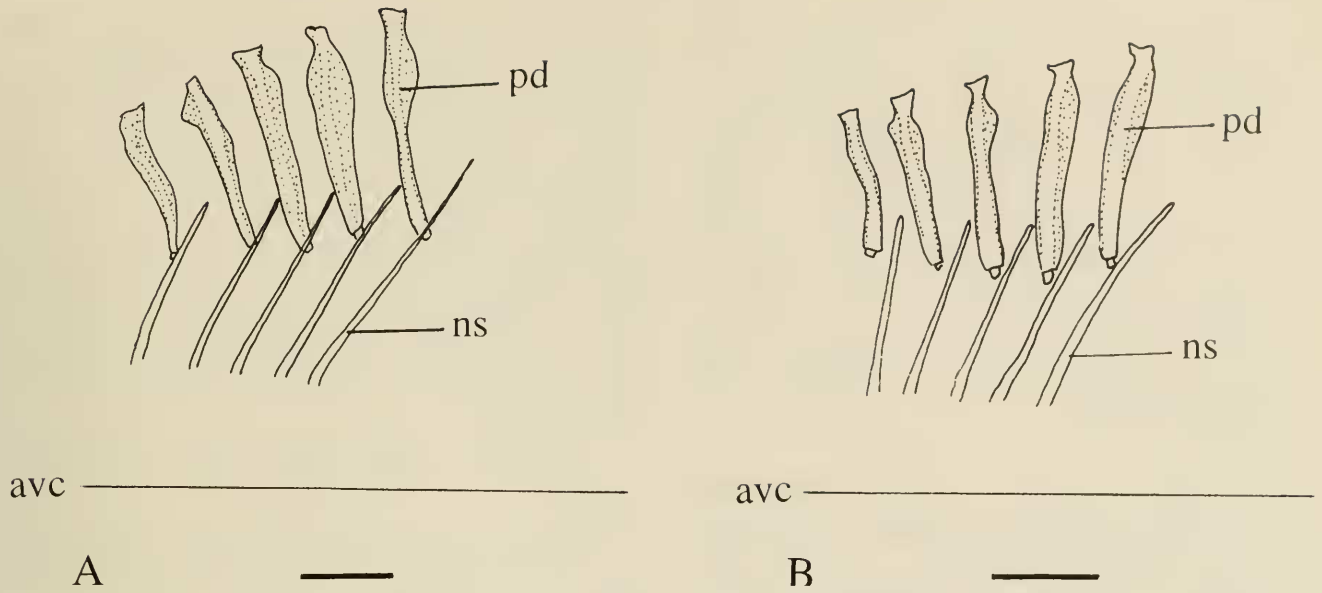

Fig. 2. Predorsal bones and corresponding neural spines in lateral view, anterior to left. A—*Pristigaster cayana,* MZUSP 30338; B—*P. whiteheadi,* n. sp., paratype, INPA 8555; Abbreviations: pb—predorsal bone, ns—neural spine, avc—main axis of vertebral column. Scale bars = 1 mm.

in holotype). Myosepta visible but not outlined by dark pigmentation. Fins hyaline, except for faint rows of melanophores along outer rays of caudal fin and a few scattered isolated melanophores on dorsal fin.

Etymology.—The name of this species is a posthumous tribute to Peter J. P. Whitehead, who contributed more than any other individual to the knowledge of clupeomorph fishes, also for first suggesting that there might be two different species in *Pristigaster.*

Distribution.—Brazil and Ecuador, in the following river basins: Rio Solimões/Amazonas, Rio Trombetas, Rio Branco, Rio Japurá, Rio Negro, Rio Madeira, Rio Juruá, Rio Araguari (State of Amapá, Brazil) and Río Napo.

Pristigaster cayana Cuvier, 1829
Figs. 3, 4

Pristigaster cayanus Cuvier, 1829: pl. 10, fig. 3; 1829:321 (name only, American seas); Valenciennes, 1847 (redescription of holotype).

Pristigaster argenteus Schinz, 1822:300 (based on Cuvier's figure; nomen oblitum).

Pristigaster lichtensteinii Jarocki, 1822: 322, fig. 3 (based on Cuvier's figure, reproduced; nomen oblitum).

Pristigaster triangularis Stark, 1828:408 (based on Cuvier's figure; nomen oblitum).

Pristigaster martii Agassiz, *in* Spix & Agassiz, 1829:55, pl. 24a (Amazon); no pelvic fins; post-dates *cayanus* by a month or so (see Whitehead & Bauchot, 1985); Amaral-Campos, 1941:187; Whitehead & Myers, 1971; Le Bail et al., 1983.

Pristigaster americanus Guérin-Menéville, 1844:33, pl. 57, fig. 3 (Atlantic coast of South America).

Pristigaster phaeton Valenciennes, 1847: 338 (Amazon); no pelvic fins (see Whitehead & Bauchot, 1985).

Pristigaster cayana; Myers, 1956 (validity of *P. cayanus* Cuvier as of 1829; emmendation of specific name to agree with feminine gender of genus); Hildebrand, 1964 (synonymy of *cayana, phaeton* and *martii*); Whitehead, 1964:428, fig. 108 (synopsis); 1967:100, 102 (types of *cayana* and *phaeton*); 1973a:85 (*triangularis*

a nomen oblitum; synonymy); 1985:301 (in part, only specimens without pelvic fins; synonymy, diagnosis; distribution; habitat and biology); Whitehead & Myers, 1971:487 (validity of *martii*); Whitehead & Bauchot, 1985:24 (in part, only specimens without pelvic fins; types of *cayana, phaeton*); Eschmeyer, 1998:347 (catalog and suggestion—not accepted here—that name is not available from Cuvier, 1829).

Material examined.—95 specimens (23.5–142.0 mm SL). Brazil. Amazonas: MZUSP 31032 (1, 90.0), Lago do Prato, Rio Negro, Anavilhanas; MZUSP 11389 (1, 142.0), Lago Puraquequara; MZUSP 52947 (1, 64.0), Lago Manacapuru; MZUSP 7023 (20, 52.5–74.0, 2 of which cleared and counterstained), Rio Madeira, 25 kilometers below Nova Olinda; MZUSP 11405 (1, 37.5), Rio Solimões, Ilha do Xibeco; MZUSP 9568 (1, 96.0), Manaus; MZUSP 18696 (1, 92.0), Rio Solimões, Lago Janauacá; MZUSP 52943 (1, 23.5), Rio Negro, 1°58′16″S, 61°15′42″W; MZUSP 52944 (6, 30.0–36.0), Rio Içá, 3°03′57″S, 68°04′26″W; MZUSP 52945 (1, 34.0), Rio Solimões, 2°40′15″S, 66°39′14″W; MZUSP 52946 (1, 62.2), Rio Japurá, Paraná do Japurá, 3°08′20″S, 64°46′52″W; MZUSP 1388 (1, 111.0) and 11390 (1, 86.0), Rio Juruá; BMNH 1925.10.28.5 (1, 88.9), Rio Solimões, Manacapuru. Roraima: MZUSP 30334 (1, 137.0), Rio Branco, below Xeruini; MZUSP 30335 (1, 112.0) and 30337 (1, 103.0), Rio Branco, Marará; MZUSP 30339 (2, 100.0 and 110.0), Rio Branco, Lago do Maguari; MZUSP 30340 (6, 68.3–82.5), Rio Branco, Xeruini; MZUSP 52942 (1, 105.0), Rio Branco, 1°16′59″S, 61°50′52″W. Rondonia: MZUSP 30336 (1, 81.0) and 30338 (29, 33.0–66.0, 3 of which cleared and counterstained), Rio Madeira, Calama. Pará: MZUSP 5560 (2, 72.0 and 73.5), Lago Ururiá, Oriximiná; MZUSP 5668 (1, 82.5), Lago Puru, Oriximiná; MZUSP 8280 (1, 97.0), Rio Trombetas, Oriximiná; MZUSP 5689 (1, 72.0), Rio Trombetas, mouth of Lago Paru. Mato Grosso: MZUSP 17030 (1, 29.0), Rio Araguaia, Santa Terezinha; MZUSP18627 (2, 116.0 and 126.0), Rio Araguaia, Lago Dumbá. PERU. Loreto: FMNH 71264 (1, 100.0), mouth of Río Tigre, 80 miles SW of Iquitos; MZUSP 15217 (1, 83.0), Cocha Aguajal, Río Amazonas, Iquitos: MZUSP 15216 (2, 83.0 and 88.0), Río Marañon, Nauta; Pucallpa: MZUSP 18557 (1, 47.0), Río Ucayali.

Diagnosis.—See diagnosis of *P. whiteheadi.*

Description.—Meristics and morphometrics are presented in Tables 1 and 2. Body form and disposition, shape and arrangement of abdominal scutes (30–35 in number) as in *P. whiteheadi.*

Shape, size and position of snout, eye, pupil, adipose eyelid, mouth, maxilla and also shape, arrangement and number of teeth as in *P. whiteheadi.* Number of teeth also increasing with growth. Premaxillary teeth 9 (in specimens <25 mm SL) to 23 in larger specimens. Maxillary teeth 18 (in 23.5 mm SL specimen) to 80 (in 105 mm SL specimen). Dentary teeth 7 (at 54 mm SL) to 14 in larger specimens.

Shape of gill cover, gill membrane and shape and disposition of gill rakers and position of dorsal limit of gill opening as in *P. whiteheadi.* Number of gill rakers also increasing with growth, ranging from 21 (at 45 mm SL) to 25 (at 110 mm SL) on lower part of first branchial arch and from 9–12 on upper part.

Pelvic fins absent. Position, shape and size of all other fins and axillary scale identical to those of *P. whiteheadi.* Dorsal-fin rays iii+12–13. Pectoral-fin rays i+10–12. Anal-fin rays ii–iii+44–53. Caudal-fin rays 10/9. Tips of dorsalmost two branched upper lobe caudal-fin rays elongated into filament twice as long as first principal ray (unbranched) in a specimen 100 mm SL. Tips of eighth and ninth lower lobe caudal-fin rays also prolonged into a shorter lower lobe filament about one-third as long as tenth (unbranched) ray in same specimen.

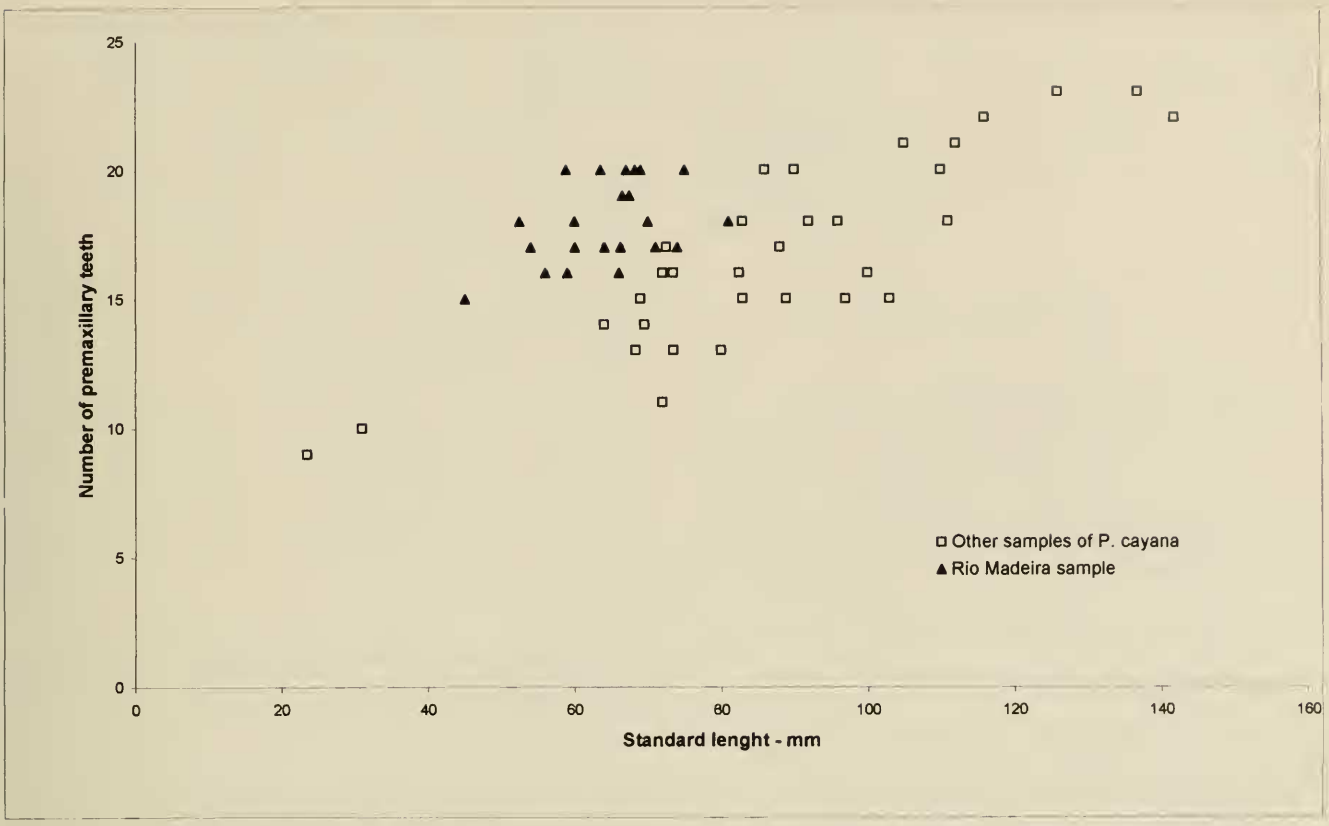

Fig. 3. Size-dependent variation of the number of premaxillary teeth in *P. cayana.*

Upper and lower caudal-fin filaments frequently broken in preserved specimens. Vertebrae 43–44.

Size, shape and distribution of cycloid scales on body and fins as in *P. whiteheadi.* Vertical scale rows 40–47. Horizontal rows 21–26.

Pigmentation in alcohol.—As in *P. whiteheadi.*

Distribution.—Nearly coincident with that of *P. whiteheadi,* with which it is sympatric in most localities of the Amazon Basin, but extending further south into Rio Araguaia, State of Mato Grosso, Brazil. The locality associated with the holotype of the species is reported as Cayenne, French Guiana (Whitehead 1967). This information is not provided in the original accounts on the species by Cuvier, which state simply "seas of America". Other reports on the type-locality have inferred it from the species name (e.g., Myers 1956). Representatives of *Pristigaster* have never been collected again in French Guiana, in any of the surveys of the area (e.g., Le Bail et al. 1983, Planquette et al. 1996, also P. Keith, pers. comm.). The genus has also not been reported from surrounding areas, like Guyana, Suriname or the Orinoco basin. We strongly suspect that the Cayenne locality is erroneous, and may simply reflect a port of shipment or an intermediate post en route between South America and France, in which the material studied by Cuvier may have remained temporarily.

Remarks.—The sample from Rio Madeira differs from remaining ones in number of premaxillary teeth (Fig. 3), but no other meristic or morphometric difference was found between that population and others throughout the range of the species. In the absence of additional significant differences we prefer to consider the higher number of premaxillary teeth in the Rio Madeira sample as populational variation.

Notes on the name P. cayana.—The history of the names associated with the species referred to here as *Pristigaster cayana* is rather complicated. The first reference to the species was done in Cuvier (1816), as

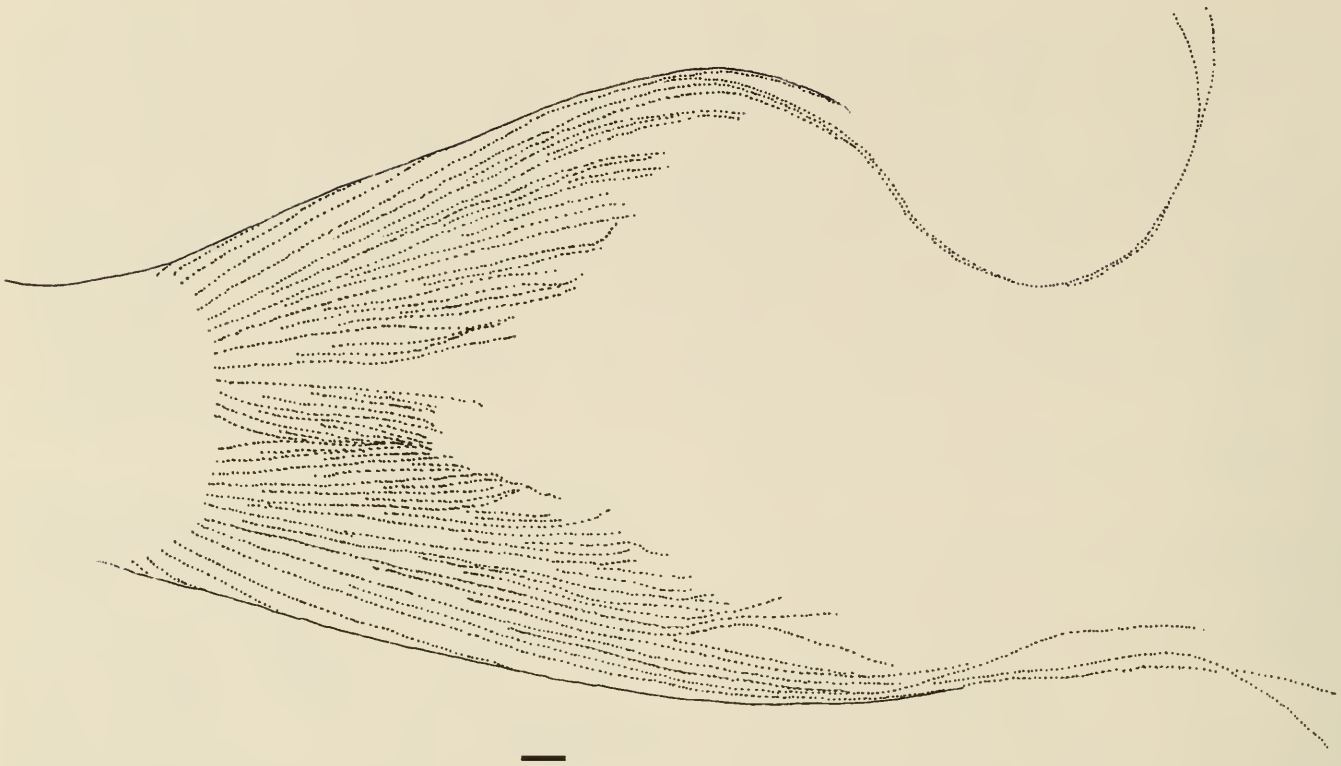

Fig. 4. *Pristigaster cayana,* MZUSP 30340; caudal fin in lateral view, showing filaments. Scale bar = 1 mm.

an illustration associated with the genus name only. In 1829, Cuvier proposed the name *cayanus* for the species figured in 1816, in what is clearly a valid species description as was shown by Myers (1956). The species name therefore must date from 1829, and it precedes the validly described *P. martii* by a month or so (Whitehead 1985:301). Various other names (*argenteus, lichtensteinii* and *triangularis*) were proposed between 1816 and 1829, all on the basis of the same illustration in Cuvier (1816). We consider all of these names to qualify as nomina oblita according to the International Code of Zoological Nomenclature (ICZN, 1985, Art. 79c). They have never been used subsequently as the valid names for the species, and the junior synonym, *cayanus,* has certainly been used in more than 10 publications by more than five authors in the intervening period (e.g., Valenciennes 1847, Günther 1868, Jordan & Evermann 1896, Norman 1923, Ihering 1930, Myers 1956, Whitehead 1967, 1973, 1985; Whitehead & Bauchot 1985).

Discussion

As demonstrated in this paper, in spite of the overall similarity in body shape and pigmentation, *Pristigaster cayana* and *P. whiteheadi* are clearly distinct and diagnosable through several morphological features. When suggesting the recognition of a second species of the genus, Whitehead (1985) and Whitehead & Bauchot (1985) based their observations on just a few specimens and did not notice some of the striking differences we found. In the diagnostic features of *P. cayana,* Whitehead (1985) described the pelvic fins as usually absent, indicating that presence or absence could vary within the species. At the same time, however, the author considered that one species without pelvic fins and high gill raker counts (22–24, usually 23) could possibly be different from a species bearing pelvic fins with lower gill raker counts (19–20, usually 20). Results of our study reveal that presence of pelvic fins is indeed diagnostic. They exist only in *P. whiteheadi* and

are consistently present from the smallest to the largest individual of both sexes. Gill raker counts overlap to a certain extent, but there is a significant mean difference (see Table 1) between the two species. Other differences pointed out in the diagnosis of *P. whiteheadi* leave little doubt that there are indeed two separate species in *Pristigaster*. None of the various other names applied to *P. cayana* (see synonymy above) could possibly have been based on the new species. They either were based on Cuvier's 1816 illustration or clearly mentioned the absence of pelvic fins in specimens examined.

The two *Pristigaster* species share the highly peculiar expanded morphology of the abdomen, to a degree which distinguishes them from all other recent clupeiforms. Not only the depth, but also the shape of the abdominal expansion (abruptly emerging nearly vertically from gular region) are obviously apomorphic conditions not seen elsewhere in other recent clupeomorphs, and strongly suggest that *Pristigaster* is monophyletic. These characteristics are associated with a host of internal-anatomical modifications not yet studied in detail, and which will be the subject of a forthcoming paper.

Sexing of most of the specimens of both species examined did not reveal any obvious sexual dimorphism. It also tested the validity of our interspecific diagnostic characters by showing that the differences were not simply due to sexual dimorphism.

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